Good Practice in Action

Tackling Climate Change

Communities Making a Difference

ACT International
Action by Churches Together

All over the world, entrepreneurs, local authorities, and associations are moving forward into action, coming up with new technology, new trades, new relationships between humanity and nature. Their creativity is moving forward into a new century that is cleaner and fairer, more natural and at the same time more human….It is too late for pessimism. We are now well aware that solutions exist. We all have the power to change things. What are we waiting for?

Yann Arthus-Bertrand, 'Inventing a New World', from the preface of his book "Home, A Hymn to the Planet and Humanity", 2009.

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Foreword

The world community is confronted with a growing number of disasters caused or aggravated by climate change. This publication outlining good practice in action, titled "Tackling Climate Change: Communities Making a Difference", provides practical case studies of successful disaster risk reduction and climate change adaptation and mitigation projects implemented by ACT members or their partners around the world.

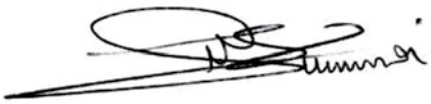
The guide includes 14 case studies, which describe local projects that range from renewable energy to controlling water in areas that have too little (or too much). The case studies highlight the strength and resilience of local communities in taking charge of their own lives and planning for a safer future.
This publication represents a small sample of ACT implemented and funded projects related to climate change and disaster risk reduction. It seeks to increase awareness, promote learning, and trigger appropriate actions among ACT members and their partners. The examples of good practice may be appropriate in other locations and adaptable to local cultural sensitivities and environmental concerns.

We know all too well the consequences if greenhouse gases are not drastically reduced. As a Christian alliance, ACT members are joining with other non-governmental organisations in urging their governments to make substantial reductions in carbon emissions. For everyone's sake—but especially for the poor—we need a fair and effective climate agreement in the next decade that ensures substantial and efficiently delivered funding to help communities address potential hazards and prepare for future climate changes.

I would like to thank everyone who contributed to this publication. A special word of thanks goes to all our ACT members and their partners who submitted case studies and communicated regularly with the drafting team; our ACT members which funded this initiative; and to the Chair and members of the ACT Climate Change Group who led this initiative.

I wish our members and their partners continued success in supporting, enhancing, and endorsing grassroots efforts and locally based contributions to addressing climate change and disaster risk reduction.

John Nduna
Director



ACT International Coordinating Office
Geneva, Switzerland

ACT principles on climate change

Principle 1: Integrate climate-related considerations into ACT member activities, ensuring that the rights of communities and crisis-affected populations are addressed and genuine partnerships created.

Principle 2: Promote and address 'adaptation' and 'mitigation' as key approaches.

Principle 3: Develop ACT member capacities to address the challenges of global climate change.

Principle 4: Ensure programme planning and management reflects ACT policies and principles on climate change.

Principle 5: Advocate for the integration of climate change responses in national and sub-national policies and programs.

Source: 'Guiding Principles on Climate Change for the ACT International Alliance', 2009

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Introduction

"The era of 'unlimited consumption' has reached its limits. The era of unlimited profit and compensation for the few must also come to an end… [we propose]…a concept that expresses a deep moral obligation to promote ecological justice by addressing our debts to peoples most affected by ecological destruction and to the earth itself... Ecological debt includes hard economic calculations as well as incalculable biblical, spiritual, cultural and social dimensions of indebtedness."

World Council of Churches, Statement on Eco-Justice and Ecological Debt, September 2009

Climate change has become a defining issue of our time. The global challenges it presents are enormous and they affect us all. Our responses will define the future for millions of people. People in developing countries have been the hardest hit. They have become more exposed to climate threats, especially those whose livelihoods are based on agriculture, fishing, and pastoralism. People who live in arid and semi-arid areas, on floodplains, islands or near coasts are especially at risk. Women, girls, the elderly, persons with disabilities, and those who are sick are among the most vulnerable.

The grim threat to the human species and the natural environment brings with it opportunities. There is increasing evidence that local people have the strength, ingenuity, and willingness to adapt to climatic changes. Occasionally, an intense weather event – a cyclone, severe flooding or a hurricane – destroys or limits people's capacity to adapt. However, given an innate determination to survive, any credible climate change adaptation strategy must include building local capabilities. Adaptation and disaster risk reduction strategies have to coincide with poverty alleviation and improved livelihoods initiatives. And all strategies must promote renewable energy sources for local use, not just large-scale energy initiatives.

We can't afford to just sit and wait when there are means to avoid, reduce, or delay climate change impacts. While it is true that mitigating climate change needs a sustained global effort, we can all make efforts to reduce the production of greenhouse gases in our every day lives and in the programmes we support. For example, we can substitute the use of fossil fuels such as coal, oil, and natural gas with renewable energy sources, such as solar, wind, or water. We can consider walking or biking instead of using the car.

One of the big dilemmas we are faced with today is how to improve people's standard of living without compromising the ability of future generations to do the same. This will require a change in the demands we put on our planet's natural environment and the way each person thinks and acts.

We live in a time of uncertainty, but also of hope. In the pages that follow, hope shines through.

"Let there be light!"

Solar electrification of rural villages

Summary

In war-torn Afghanistan, one of the world's poorest countries, an innovative project is harnessing the power of solar technology and the resources of rural communities to bring solar electrification to villages. Local men and women are trained as 'barefoot solar engineers' (named after the Barefoot College in India where it was invented) to install and maintain the technology and work with local people.

ACT implementing member: Norwegian Church Aid and its Afghan partners: Coordination of Humanitarian Assistance (in Faryab), Afghan Development Association (in Uruzgan), and Ghazni Rural Support Programme (in Daikundi).
ACT funding member: Norwegian Church Aid
Location: 118 villages in different provinces
Coverage: About 7,800 homes

Power from the sun

Four out of five people in Afghanistan live in rural areas. They cook and heat water with wood (from shrubs and bushes) and crop residues. They use kerosene, derived from the fossil fuel petroleum, to light their homes. Burning fossil fuels inside a house has severe health consequences, especially for women and children who are more likely to be indoors. And with demand for wood increasing, shrubs and bushes are disappearing, soil is increasingly being eroded, and floods are becoming more frequent.

There is an enormous need for electricity in the country's rural poor areas, but connection to the national grid is unlikely for most. Developing an alternative, renewable source of energy is urgent. This project offers such a naturally replenished source for home energy – solar power – and reduces the need for kerosene for lighting and wood for cooking and heating.

Village elder cleaning solar panel

Although solar energy (photovoltaics) is still considered costly for household installation, in recent years, high quality installations have become available in developing countries. It has also proven to be an efficient off-grid energy solution. It is easy to use, install, and maintain.

Photovoltaics (also called PV) is the field of technology and research related to the application of solar cells for energy by converting solar energy (sunlight, including ultraviolet radiation) directly into electricity (solar electricity) using solar panels.

Powered by the people

Harnessing the power of the sun is not new, but involving communities in harnessing the power of the sun for sustainable energy is. With assistance from Norwegian Church Aid, the project was designed to train community members to install and maintain home solar energy systems in Afghanistan using 'the barefoot approach'. The barefoot approach is not just about installing solar energy systems in homes; iut also involves communities in ways that enable the power of the sun and the power of people to blend together to create sustainable energy.

Women trained in solar energy – a first for Afghanistan!

In 2005, Norwegian Church Aid began a pilot phase with its Afghan partner organisations in one village in each of the provinces of Badakshan, Bamyan, Daikundi, Faryab, and Uruzgan. Villagers were asked to select two people, one male and one female, to be trained as barefoot solar engineers (BSEs). The

Afghanistan: Project locations

trainees had to be young, poor, and respected individuals, with a requirement of at least semi-literacy. While the first pairs were married, later trainees were usually related to each other to respect cultural sensitivities. This was the first time in Afghanistan that women had been trained in solar technology.

In the end, six men and four women were trained on the barefoot approach at the Barefoot College in India for six months. They learned the scientific principles and basics of electricity and electronics, and how to assemble, install, operate, and repair solar photovoltaic systems. When they returned they were capable of managing and maintaining the system themselves.

Communities setting the rules

Operating rules and regulations were decided and agreed by each community in cooperation with the trained engineers. The community agreed to contribute a monthly fee, collected from each household, for the system's repair and maintenance and to pay the BSE's wages at a level agreed by each community. A rural electronic workshop established by the project and equipped with the necessary tools allows the BSEs to carry out all major and minor repairs.

Scaling up

By August 2009, 56 men and 28 women had been trained as BSEs. Nearly 7,800 homes in 118 villages have solar electrification and 44 rural electronics workshops have been established. The BSEs – all of whom have continued to work in their own village – are now involved in training young people in other villages.

Impressive gains for women

Historically, Afghan women's participation in decision-making has been minimal. There are few functioning women's organisations or movements, and in the past women were not allowed to organise or move freely. Now, female BSEs have an important position in the local community. Some are included in the male-only shuras (community councils). As role


Local barefoot engineers at work


Project meeting with members of the local village

models they enjoy a higher social status and have demonstrated their enthusiasm, courage, and desire to change the ways and traditions of their communities. Women's increased empowerment gives them more voice and impact in the wider society, which will also help in the battle with climate change.

Cost of PV installation

In this project, the cost of each PV installation including transportation, insurance, administration, and installation – 75 Wp (peak Watts) panel, 100 Ah (Ampere-hours) battery, charge controller, and four sets of lamps – is around US$500 per household. Solar technology is becoming more cost-effective with thin-film solar cells being developed in a number of countries around the world. The financial crisis has seen a significant reduction in the price of silicon which is the main component of solar cells – an encouraging sign for the future of household solar energy.

Children doing homework by solar light

Solar energy lighting up a local village by night

Unexpected benefits

The project has brought many benefits, some of them unexpected. People now believe that development is possible in areas where nothing previously has happened. The project gives people the power to handle technology. As thousands more homes have light, school children can do homework in the evening, and the young generation is aware of energy and environment issues. By reducing the demand for fuel wood, the project helps combat flooding and soil erosion.

Since people no longer burn wood and kerosene in their homes, the level of indoor air pollution has also decreased, bringing many health benefits, particularly through fewer respiratory problems and burn injuries. In addition to the BSE income generated, electrification brings opportunities to other villagers who can now work indoors after dark (e.g. in carpet weaving and tailoring).

It really works!

A 2008 external evaluation found that the community systems were operating well and the BSEs were performing their agreed tasks. It concluded that the project could be replicated in other semi-tropical and tropical countries, with the necessary local adaptations.

Contacts and Further Reading

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"Raising homesteads, raising hopes"

Communities adapting to climate change

Summary

The aim of the project is to increase people's resilience to natural disasters and the negative impacts of climate change. Two components of the project are particularly innovative: first, raising land and homesteads onto plinths to reduce exposure to floods; and second, cultivating crops on floating platforms – commonly called 'bairas' (floating gardens) – so that livelihoods are not disrupted by floods.

Implementing partners: Rangpur Dinajpur Rural Service and the Bangladesh Centre for Advanced Studies (for the floating gardens component)
ACT funding members: Norwegian Church Aid, Finn Church Aid, and Church of Sweden
Location: Three districts in northwest Bangladesh – Rangpur, Lalmonirhat, and Nilphamari.
People covered: Direct participants 10,500 households, more than 70% female. Indirect participants: approx. 32,000 households.

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Living on the edge

Vulnerability is a fact of life for the people of north-west Bangladesh. The project districts are climate-sensitive, disaster-prone, and poor. Drought, floods, and cyclones are an ever-present threat. Hunger is common during September and October, before the harvesting of the rice crop.

Raising plinths

Plinths are not new in Bangladesh, but many are made of sand or silt and get completely washed away during floods. Under this project, community members raise their land onto durable plinths to protect them when floods arrive. The raised plinths are a permanent structure, either made of soil, earth, and stones (which is a rare and expensive commodity), or of bricks and cement. Size varies, with heights of up to four feet, depending on the water level in times of floods and the projected increase from the effects of climate change.

Homesteads raised some feet off the ground on improved plinth constructed by local communities (photos by Prodipan)

To build their plinth, people obtain soil from neighbouring areas and cement and stones from the project free of charge, but they provide, or pay for, the labour. Each plinth has a financial cost of approximately US$100. During plinth construction, the work is supported by a supervisor, field officer, and engineer in each sub-district. Project workers also share information on hygiene practices, water and sanitation, home gardening, and the production of biogas.

Cultivating on water

The project also encourages people to build floating gardens, or "bairas". Bairas are a type of floating cultivation without soil, made by piling together water hyacinths and other aquatic plants. On the floating platform seedlings, vegetables, and crops can be grown because they get nutrition from composted organics or from the water. During periods of high flooding and water logging field crops are often damaged, but crops on baira can survive because they rise above the flood levels.

Woman tending to her floating garden from a small boat

Man standing by floating garden made from bamboo and hyacinths piled on top of each other

Bangladesh: Project locations highlighted in red

Building a "baira"

Farmers place bamboo poles onto a dense growth of water hyacinths. More hyacinths are piled on top. Other aquatic plants like deep-water rice, straw and Azolla (an aquatic fern) are added. The volume or thickness of this pile depends on the duration of floods or water logging, to ensure that the pile will float throughout the flooding period. Farmers normally move this pile to an area where it can be managed better and anchored, as constant movement can undermine the stability of this floating garden.

Around 15 days after construction of the bairas, farmers transplant seedlings or scatter seeds into it. Normally, they apply intercropping techniques by combining all sorts of vegetables and staple foods like amaranth, potato, radish, ladies' fingers (okra), cabbage, cauliflower, tomato, and cucumber. Usually, they can harvest two or three times during the lifespan of one baira.

During floods and water logging, many people in Bangladesh suffer from food shortages because the crops in the fields get water logged. By using floating gardens, people can still grow a wide variety of crops and achieve good yields. During the dry season, bairas can be used as organic material for fertilising arable land.

"Turning the tap on"

A family agriculture programme for the poor

Summary

Bringing water under people's control is a key aim of the project. Through rainwater catchment and water storage facilities the project seeks to help people adapt their lives to sparse and irregular rainfall, and to use water to practice agro-ecology – a type of farming based on ecological principles and relating closely to the natural environment. Farmer understanding of the relationship of agriculture with the natural environment is crucial to the programme's success. The goal is for more families to have vital water access for drinking, cooking and irrigation. By addressing this critical issue, families have increased scope for additional improvement of living conditions and livelihoods diversity.

Implementing partner: Diaconia, Brazil
ACT funding member: Norwegian Church Aid
Location: North East Brazil, Upper Pajeú, in the State of Pernambuco, and the Midwest of the State of Rio Grande do Norte.

Threats to water supply

With 20 million inhabitants in 900,000 square km., this part of Brazil has the distinction of having the world's most densely populated semi-arid region and the poorest people. Low and irregular rainfall dominates people's lives. It affects food security, health and general well-being – and climate change has only added to the problem creating irregular rainfall cycles. In rural communities, the most severe impact is felt by the poorest people.

The land, water and biodiversity are controlled by a few large landowners who also dominate the region's politics, resulting in the social and economic exclusion of the poorest of the poor. The trend to commercialise water threatens the access and right of people to water sources and springs. With more and more drinking water coming under the control of private companies, water is supplied to those who can pay leaving others without.

Harvesting - with a difference

The project encourages new and innovative methods for water harvesting by developing and adapting ways to catch and store rainwater in cisterns, sunken dams and enhanced water ponds, as well as improving the ability of the families to manage the accumulated water and handle their new skills and tools.

Catching roof water

The project has introduced prefabricated "cisterns" for storing rainwater coming off roofs of houses, with a capacity for 16,000 litres of water for drinking and cooking. They supply water for drinking and cooking for a family of up to eight people, for one year. The families contribute to the construction by supplying the manual labour, digging the hole in which the cistern will be built, and providing meals for the workers. The construction is completed in five days. Each family that receives a cistern is trained in water resource management, learning how the family should take care of the cistern, methods of treating the water, while at the same time protecting the environment. Overall, the project has contributed to the construction of 13,000 rainwater catchment cisterns for drinking and cooking, out of around 300,000 cisterns constructed through Government programmes and other NGOs in this semi-arid region.

Storing "eating water"

When the roof of a house is too small to catch enough rainwater to fill a 16,000 litre cistern, the family qualifies for a ground run-off cistern. This

Dams are sited where there are natural embedded rocks, which are then surrounded by a brick wall, making the water accumulate

Digging trench – the first step in underground dam construction (Here they are lucky to have a digger and hence don't have to dig with shovels and picks)

A tarpaulin is placed against one of the sides of the trench and fixed at the bottom with concrete. The trench is then filled in again. The rain water seeping into the soil is prevented from seeping downhill, creating a marsh.

Making concrete rings for lining wells and water tanks. On the side of the marsh, wells are dug and lined with concrete rings, whichfill up with the water less the soil.

cistern is larger (52,000 litres) and is placed deeper into the ground, since it harvests the rainwater running off a concrete court – hence the name 'ground run-off cistern'. The water is used for household irrigation purposes with one cistern built per family. It aims to store enough rainwater for the production of food for the family. Thus, the water collected is often referred to as, "eating water". It is situated on the small farmer's land, and is managed by the family. Every family is trained on how to care for the cistern and manage food production.

Underground dams

Underground dams - sunken storage vessels - have been another approach to reduce the threat to water supply and improve food security and development opportunities. Some 215 dam structures have been built – being below ground ensures that less water is lost to evaporation. This structure is built at the foot of an incline or slope. The water flowing down the slope seeps into the soil and underground but instead of getting lost, it is blocked by a tarpaulin lined trench anchored to the dam wall (see pictures). The trench is then filled in so that rain water seeps into the soil creating a marsh. At the edges of the dam wall some wells are dug and these fill up with rainwater. The surrounding soil is damp and favourable for growing crops, primarily for domestic consumption.

Enhanced water ponds

An innovative element of this project is the construction of enhanced water ponds with a 700,000 litre capacity for storing rainwater. This water accumulates naturally on an already existing slated rock bed and the farmer turns this relatively small pool of water into a very large pond by enclosing it on two sides with brick and cement walls. The water is used for irrigating vegetable gardens and orchards. An above-ground tank is built nearby and water from the tank is pumped into it, from whence it flows through irrigation pipes and hoses, by the force of gravity. Bricklayers from the community are involved in the construction, having been specially trained for this initiative. Though it is still at the experimental stage, a total of 22 such ponds are expected to be built by the end of 2009.

How has it benefited farmers?

Taken together, all technologies have created greater water self-sufficiency and improved food security. The goal is that all families have a 16,000 litre cistern with rainwater for drinking and cooking purposes, and a 52,000 ground run-off cistern for farming purposes. Priority is given to the poorest families, with the greatest number of children and elderly people. But long term, the plan is to provide cisterns for all families. Better off families are able to pay for the construction of a cistern or cisterns on their own initiative.

Edvaldo's story

One farmer, Edvaldo Rodrigues do Nascimento, lives on a 1.5 hectare property in Carnaíba, Pajeú, with his wife and their five children rearing livestock, and cultivating a variety of vegetables and fruits. In his opinion, once his family tasted the good water from their 16,000 litre cistern provided by the project (and experienced the health benefits), they were encouraged to make other improvements.

Part of their land is sometimes flooded by the Pajeú River. When they set up the 52,000 litre cistern with the support of the project, they transferred crops which cannot withstand floods to an area near the house and "In the place that is flooded, I plant corn and beans, because they are crops that are flood resistant". seu Nino invented a hand pump (using the wheel of a bicycle, a bucket, and some plastic piping) which has made it easier to take water from the cistern. He says that his role now is to share the good changes that he has made. He no longer uses chemical products on the crops, and the family is most proud of their vegetable plots.

Providing technical assistance

Technical and economic assistance is offered which includes helping farmers set up solidarity revolving funds so that loans can be accessed to carry out activities. Farmers can benefit from simple scientific knowledge to improve the efficiency of their farms. The project for example, supports farming families who wish to sell their crops - helping to build infrastructure for the storage of fodder and agricultural products before market.

Brazil: Project locations highlighted in red

Spreading the word

The project encourages farmers to exchange know-how, spread the word, and learn from each other. Practical information is shared such as the importance of diversifying crops, how to plan annual planting, and how to guarantee feeding livestock each year. It helps families living in traditional agricultural communities and in agrarian reform settlements where land has been redistributed to poorer farmers. Farmers' knowledge of their local natural environment and locally proven solutions are shared and techniques exchanged in meetings, workshops and seminars.

Water tank for irrigation purposes. Water is pumped into this above-ground circular cistern. With a controlled outlet at ground level, the force of gravity gives pressure for the farmer to release the water for irrigation purposes, using a long hose.

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"A plant for our time"

Grassland management in Inner Mongolia

Summary

This project encourages farmers in a very dry area to plant the shrub shaji (sea buckthorn). Grown on rocky ground, the shrub helps to stabilise the soil. It also produces seeds and leaves that are sold as ingredients in a range of health products; this increases the farmers' income. The project shows how people are adjusting to dry weather, barren land, and making the most of local natural resources. It also demonstrates how a shrub previously seen as a nuisance can be marketed for the benefit of the environment and can generate additional household income.

ACT implementing member: The Amity Foundation
ACT funding member: Evangelischer Entwicklungsdienst (EED - Church Development Service)
Location: Erbaoliang & Erzihao Village, Dalate County, Inner Mongolia
People covered: 12,000 farmers

Losing valuable land

Much of northern China has now become virtually treeless. Attempts to grow trees to stabilize the soil are usually unsuccessful. The thorny deciduous shrub, shaji, has proven useful because it withstands severe weather and has an extensive root system.

Dalate County is a drought and sandstorm area where farmers spend most of the day working, sometimes in sandstorm conditions. Many farmers know that shaji has a natural hardiness and vigour that allows it to grow and thrive in poor conditions and on barren land, and resists cold and drought. Farmers did not, however, see the shrub as an economic opportunity. After promotional work done by the farmers' association, more and more became interested and began to plant it.

Shaji (sea buckthorn)

Originating in the Himalayan Mountains, shaji (Hippophae rhamnoides) occurs naturally across large areas in Asia and Europe. More than 90% (about 1.5 million hectares) of the world's shaji can be found in China where the plant is exploited for soil and water conservation. The shrub produces marketable leaves and a small fruit, smaller than soya beans.

Shaji with fruit in autumn

Using traditional tree species

The shaji planted in the project area is a traditional species and does not cause problems for other local vegetation. Farmers in the two project villages plant shaji seedlings in rows, averaging 1,800 seedlings per hectare. The seedlings are raised in local commercial nurseries. The shrubs sprout leaves some four months after being planted. After three years, the farmers are able to harvest the shrub's fruits. Oil can be extracted from either the seeds or the pulp of the fruit.

The government has in the past allocated funds for shaji planting, but local farmers would cut the plant down as the thorns of shaji can hurt sheep. Sheep herding is now prohibited in Dalate County to eliminate overgrazing and soil erosion.

Barren no longer

The area where shaji is grown has soil made of silty sediment deposited by wind storms over the years that is highly prone to erosion. Barren areas are often regarded as poisonous by local people due to lack of vegetation. The shrub protects the soil from erosion and brings income to local farmers, thereby contributing to environmental protection and poverty

Sea Buckthorn (Shaji) Forest

reduction, although it is not well-known for its protective uses. In the past, farmers saw it as a hindrance to animal husbandry. Now, due to the ability to sell the fruit and leaves, it has becomes a valuable resource which is planted and maintained. Since the plant resists harsh weather and poor soil conditions, it is becoming an important source of adaptation to climate change.

Locals planting Shaji in barren areas

Finding markets

For the farmer, the challenge with shaji is identifying markets, but if farmers work together, they can sell shaji fruits in large quantities to fruit-drink manufacturing companies. Farmer associations serve as the vital link between individual farmers and the fruit-drink companies, enabling them all to share the economic benefits. They spread the ecological benefits of shaji as farmers start planting on a large scale.

At the end of 2008, fresh shaji leaves were earning the farmer 4 yuan (approx. 50 US cents) per kilogram and the fruits 1.2 yuan per kilogram. The leaves are picked in early June and the fruits are picked after mid-October. The temperature for storing the leaves and fruits must be between 7 to 8 degrees below zero. Farmers can store them outside in winter, but not during the other seasons. Until now this has meant that they cannot control when to sell the crop. The project hopes to address this in the future.

Income soars

There is a market for both the fruits and the fresh leaves. The shrub's golden-orange

The Shaji harvest

Choosing and packing the Shaji leaves for selling

fruits serve as an ingredient in medicinal preparations, oils, creams, fruit juices, and tea. The fruits provide vitamin c, vitamin e, and other nutrients and oils rich in essential fatty acids. The leaves are used to make beverages, shaji flavouring, tea, cosmetics, vinegar, and other products popular among Chinese consumers.

The average annual income per head in the project area is 4,104 yuan (approx. $580), before shaji is considered – this is average for low-income families in China. In the project area, selling shaji has added an additional 800 to 1,500 yuan to the family's annual income. In places outside the project area where markets are more advanced and where families participate in farming cooperatives, their total annual income can be more than 10,000 yuan a year. So for most farmers there is a growing incentive to plant shaji.

Member picking Shaji leaves

China: Project locations highlighted in red

Is this suitable for other countries?

Shaji has been extensively planted across much of northern China, and in other countries (e.g. Canada). It has potential for arid areas, barren lands, and harsh dry climates, especially if there are native species. China has helped a number of African countries to grow the plant, including Kenya and Zambia.

Shaji is not a panacea and caution is needed. There is a good Chinese market for products containing the shrub, and also some demand in other countries. But the potential local demand and export logistics would need careful country-specific assessment. In some US states sea buckthorn (shaji) is banned from retail sale as it is considered invasive, affecting other crops by underground runners. No such problems have been reported from Mongolia.

Contacts and Further Reading

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The main organisation overseeing and promoting the use of shaji in China is the **China Research and Training Centre on Sea Buckthorn**, www.isahome.net

"Early warning, early action"

Monitoring and minimising landslides and floods

Summary

In a region prone to landslides and floods, the Centro de Protección para Desastres (Centre for Protection Against Disasters) works with local communities and municipal authorities to reduce the likelihood and potential impact of these events, and thus to protect people's lives.

The project focuses on monitoring both rainfall and surface movements of earth in order to predict flash floods and landslides, as elements in community-managed early warning systems. Community risk mapping, and the planting of grass and trees to stabilise slopes, reduce water run-off and enhance soil retention, are among the activities. As part of its work supporting community-led development and disaster risk reduction in Latin America, Lutheran World Relief has been collaborating with CEPRODE since 2003 to enhance the resilience of vulnerable rural and peri-urban communities in El Salvador.

Implementing partner: Centro de Protección para Desastres (CEPRODE)
ACT funding member: Lutheran World Relief
Location: municipalities of Berlín and Alegría in Usulután province
Coverage: Berlin (population of 15,205) and Alegría (population of 14,000)

Vulnerable to landslides & earthquakes

Situated in a mountainous, coffee-growing region of eastern El Salvador, the municipalities of Berlín and Alegría are vulnerable to frequent flash floods and landslides, in particular as a result of heavy rains and tropical storms. In the aftermath of prolonged rainfall, the steep slopes surrounding the city of Berlín are susceptible to mud flows, rock falls, and other sudden displacements of land. Seismic activity, though not climate-related, accentuates the risk as tremors can help dislodge already unstable land.

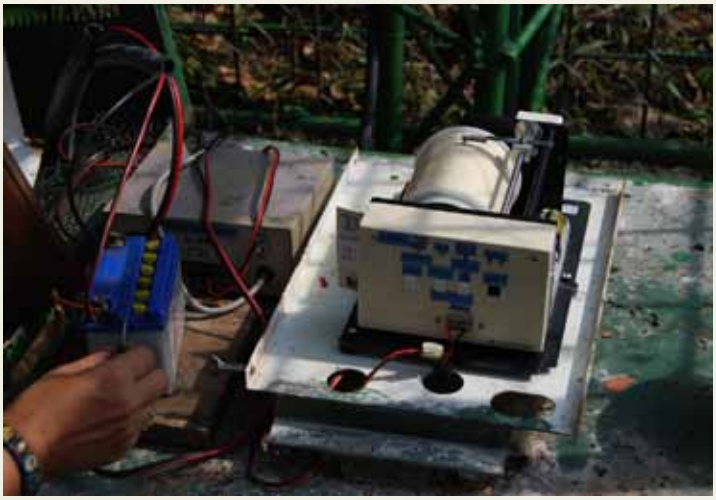
Landslides are capable of moving long distances down steep slopes into the centre of Berlín. In 1998, for example, following Hurricane Mitch the north slope of the Cerro Las Palmas mountain was dislodged and produced mud that flowed over five kilometres into the centre of the city. Early warning systems are thus essential so that people in high-risk areas can be alerted of possible floods or landslides in time to evacuate themselves to safer ground.

Devastation caused by floods and landslides in Berlín municipality, May 2007

Early Warning Systems

Modern technology and low-cost systems are both used to monitor geological and meteorological risks. On a hillside above the city of Berlin, a piece of equipment called an extensometer records ground movement on steep slopes and rocky areas. The extensometer uses a tensioned wire cable extending between a supply spool and an anchor to measure movement of the cable and the anchor, which in turn indicates shifts

Using a simple beaker as a pluviometer



Extensometer recording ground movement

Vetiver grass planted along contour lines control erosion

in the surface of the ground. The movements are recorded by a solar- and battery-powered digital recording device, which is monitored by community members.

This modern technology is complemented by a low-cost monitoring tool that consists of simple metal bars inserted into the ground in a grid, and connected by nylon string. By comparing the extent of ground movements, fractures, and geological faults within the plotted area over time, engineers are able to determine if landslides or mud flows are imminent.

At the same time, the project also focuses on monitoring the risk of flash floods from heavy rains. A network of community members has been trained as early warning system flood monitors. These monitors measure how much rain falls in a given period of time using simple beakers as 'pluviometers'. These measurements, together with analysis of extensometer readings, predict the likelihood of floods, landslides, and mud flows, and communities can be alerted in high-risk zones in time for them to prepare or evacuate to safer ground.

Risk mapping and slope stabilisation

CEPRODE trains municipal authorities and community members to map their communities, identifying existing infrastructure and assets as well as areas at risk of floods, landslides, or other disasters. It advocates for municipal authorities to relocate inhabitants in high-risk areas to safer ones, and to prevent the construction of new structures in vulnerable zones. It also undertakes activities to stabilise slopes in high-risk areas identified as a result of the mapping exercises.

The project has built retaining walls behind elementary schools to reduce the risk of hillside collapse, and it has further stabilised slopes by planting live barriers of grass and trees along contour lines, which also serve to control erosion and conserve moisture. Vetiver grass (Chrysopogan zizanioides) has proven to be an excellent crop to this end, as its dense and spongy root network can reach three metres in depth. In addition to the

benefits that vetiver grass has in terms of slope stabilisation, it carries an economic benefit as well: a group of local women entrepreneurs, supported by CEPRODE, is using the grass to produce handcrafts for sale in the local market.

Woman using vetiver grass for basket work

The project is also promoting the planting of acacia, annatto, and cashew trees, in protective strips or in windbreak rows, along with the construction of stone soil-retention barriers and run-off channels.

Cooperation with centres of learning

CEPRODE is a member of a Central American network of organisations dedicated to "Social Studies in the Prevention of Disasters" and has been instrumental in coordinating the exchange of disaster monitoring and prevention information at the regional level.

The project cooperates with the University of El Salvador on technical support for the geological monitoring component. This includes maintaining and comparing the data collected from both systems and has led to advances in standardisation and improvement of disaster mitigation and response mechanisms throughout the region. One example of such collaboration is the sharing of information gathered from the extensometer readings with the municipal government to inform action planning with government committees and community groups. The information gathered to date has also validated the reliability of lower cost monitoring devices as opposed to more expensive modern versions.

In addition to its linkages with the university, the project also works with local schools to introduce education on risk reduction and environmental issues into local classrooms.

Roadside retention wall in Berlín

El Salvador: Project locations highlighted in red

Contacts

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"In the path of climate change"

Drought preparedness in Dawe Kachen

Summary

Recurrent and intensified droughts have led to environmental degradation in the district of Dawe Kachen, notably the depletion of natural resources. This threatens the livelihoods of pastoralists. Acute and chronic food and water shortages plague the communities. The project aims to strengthen people's capacity to prepare for drought, to develop water resources for use in time of drought, and to improve livestock health.

ACT implementing member: Lutheran World Federation (Department for World Service – Ethiopia)
ACT funding member: DanChurchAid, through funds from the European Commission's Humanitarian Aid Office (ECHO)
Location: Oromia Administrative region, Dawe Kachen District of Bale Zone

Pond construction in Dawe Kachen District

A heavy toll

Pastoralists' livelihoods depend on livestock and on water. Without water, people and livestock are at risk; grasses, bushes, and trees do not grow; and crop residues in pastoral areas wither. A decade of changing climate has extracted a heavy toll. Drought has increased, rainfall has decreased, and a large proportion of the pastoralists' livestock has died. Because of the weakened condition of their bodies, the animals are highly susceptible to drought-induced diseases.

The project strengthens the capacity of communities and government officials to detect signs of drought and to be ready for its onset. The community has its own traditional way of detecting signs of drought. The project took the opportunity this afforded, and also trained both the community and government staff on the scientific ways of detecting the signs of drought, and how the community should be prepared to escape its effects. As a coping mechanism, the community travels long distances with their animals and settles on riversides.

Need for larger ponds

Climate change will most likely lead to deteriorating living conditions in drought-prone, land-locked regions as in many parts of Ethiopia. People who already are suffering from drought, like many pastoralist communities, will suffer more in the future. The changing weather will not necessarily go along with reduced average amount of precipitation, but with more irregular rainfall patterns: short downpours combined with long-lasting droughts. Therefore, it is essential to make maximum use of the rain water by storing it for periods of droughts.

Rainwater harvesting is a key part of the project. The water is "harvested" from larger areas surrounding the ponds (called the catchment area) which normally are established in small depressions, so that the water can run into the ponds by gravity. The project has so far constructed three large ponds with a capacity

of 15,000m3 (15 million litres), 35,000m3, and 18,500m3, respectively.

Ponds are traditional methods of saving water in the area but since droughts have become more frequent and severe, larger ponds are needed to store water for longer periods of time. The construction of the ponds, wells and reservoirs will mean that water is available during the dry periods and make it possible for the communities to stay in the area instead of migrating to other areas. Additionally, rainwater is harvested from the roofs of schools and health facilities. The water will be used for human consumption and for livestock in prolonged dry periods.

The silt problem

A problem with ponds is that they easily become choked with silt. The Dawe Kachen communities have vast experience of maintaining ponds by removing silt during dry periods.

The project offers other adaptive ways of minimising silt build-up, such as:

- Silt trap construction. This involves masonry work inside the pond, in the form of steps to speed the flow of water from catchments. This helps the silt to be carried by the water, rather than lodge on the bottom of the pond.
- Upper stream catchments treatment. Treatment can be undertaken by laying drains at gully areas, and by biological conservation of upper catchments areas. Control of gullies is normally is done by stone walls (to break the speed of the run-off water) inside the gullies and deviation channels (diverting the water away from the gullies) so that the water does not flow into the ponds.

Reservoirs were built to store water from roof harvesting. The capacities of the reservoirs are 150m3 each; these are constructed around schools.

Grasses and shrubs were planted around the pond catchments areas to stabilise the soil and minimise soil erosion. The grasses and shrubs can also be used as animal fodder. To help offset the problem of overgrazing, mainly elephant grass and vetiver grass species were planted. The species are very good soil stabilisers. Drought-resistant fodder trees are being planted near water points to serve as alternative feed sources.

Knowing future threats

The project is helping to extend the existing government early warning system to the pastoralist areas. The purpose of the system is to enable the local authorities and the pastoralists to prepare for potential threats and to mitigate or avoid exposure to danger. To date, the government's Disaster Preparedness and Prevention Agency has mainly addressed agricultural livelihood in the country's highland areas.

To complement the system, the project has prepared a livestock disease calendar in order to plan early vaccination campaigns before the onset of drought. This should contribute to a substantial reduction in livestock morbidity and mortality. In this way, livestock health has become an integrated part of the early warning system.

An unfair burden

In pastoralist communities, women normally spend more than 14 hours a day engaging in household and child-rearing roles. The gender division of labour in pastoral areas is unequally distributed due to religious and cultural norms. The additional burdens facing families during periods of drought fall more heavily on women than on men.

The recurrent droughts have increased their workloads with most women having to walk to far off rivers to fetch water. At the same time they have fewer pack animals, to help them carry the load, since most of their camels and donkeys have died. Pond construction reduces their workload, since rain water is harvested and is available for human use and their livestock.

Training of community based animal health workers

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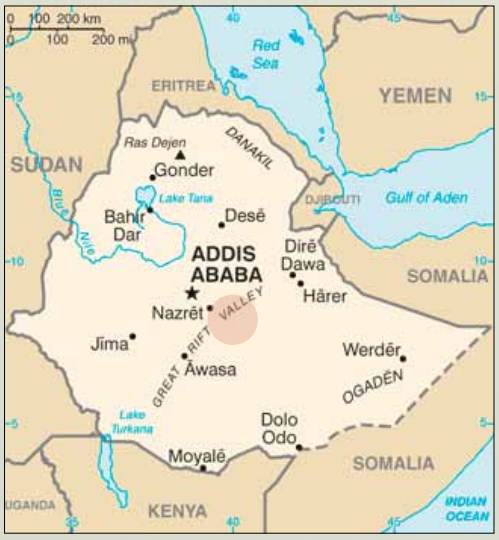

Ethiopia: Project locations highlighted in red

Women who are fortunate to have donkeys as water carriers

Children happily observe project activities

Contacts and further reading

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"It's not a disaster if we're ready"

Disaster preparedness in Orissa

Summary

The project aims to protect people and their environment from hazards and potential disasters caused by climate change. By placing special emphasis on helping at-risk communities, it encourages people to focus on their own capacities to prepare strategies for dealing with disasters. The approach, which cuts across all sectors, includes the creation of disaster management teams at village level to empower people through greater awareness and enhanced life-saving skills.

ACT funding and implementing member: Lutheran World Service India
Location: Three coastal districts of Orissa - Ganjam, Kendrapara, and Jajpur

Disaster prone

The three coastal districts where the project operates – Ganjam, Kendrapara, Jajpur - are prone to disaster. Almost every year many people are affected by climate change-related or -exacerbated calamities, such as cyclones, floods, or droughts.

The three districts have a tropical monsoon climate, with paddy crops such as rice the main agriculture produce. Due to lack of irrigation facilities, cultivation of alternative crops is not always possible. If the main paddy crop fails, then food insecurity becomes a grim fact.

Involved from the beginning

The disaster preparedness project begins by motivating people to participate in a series of meetings to analyse the pattern of disasters. People are encouraged to identify practical steps their communities can take to prepare for and mitigate disaster impacts, using participatory tools and techniques.

Village Development Committees (VDCs) and disaster management teams are set up at village level. These are responsible for coordination and management of different activities at community level, and they help to strengthen local institutions. Members of the Panchayati Raj Institutions (PRIs; local self-government) are encouraged to participate in and support these community-level initiatives. PRI members now take an active interest in disseminating information about disaster preparedness.

Different roles for different people

The disaster management teams consist of different task forces: Search and Rescue, Food and Nutrition, Shelter Management, First Aid, Early Warning, Relief Distribution, and Water and Sanitation. As women and men respond to risks in a different manner, the roles and responsibilities of the task force members are designed and planned in response to the different needs and priorities of each. Equitable participation of men and women is sought at all times.

Renewable sources

The project's activities draw their strength from making natural resource management a central part of the villagers' lives. Using natural resources (non-timber products like leaves, soft stems, straws, and grass) in a sustainable way is fundamental. Soft stems and straws are used to build floats for commuting from one area to another at times of heavy flooding. Conserving the natural environment is a key part of the project.

Banana tree raft

Bundled straw wrapped in polythene sheet with timber boards on top

Improved house with reinforced concrete-cement pillars nearing construction

Women walking towards a raised tube-well (the concrete circle) which is still above the water line during a severe flood.

Demonstrating rescue of older adult using improvised floating device

Making homes safer

The project helps people to construct and reconstruct their own homes. Where possible, elevated ground is sought to protect homes from rising water levels. Most houses in rural areas are built of locally available materials – thatch, bamboo, wood, and mud. But these are unable to withstand intense flooding and cyclones. And prolonged water-logging due to recurrent floods causes considerable damage to the foundations.

Improved building practices have been introduced. Reinforced cement-concrete pillars are used to strengthen the basic structure of the rural houses to help them withstand the effects of flood waters. This safer building practice is slowly being adopted by poorer rural families, making their houses better protected against the risk of collapse. Unstable embankments are repaired as part of community coping strategy.

Water platforms

The water and sanitation task force ensures accessibility and availability of drinking water as well as promoting hygiene. Raised wells are constructed. Known as tube-wells locally, the well sits on a raised concrete platform to ensure safe drinking water during floods. The presence of women in the task force provides an opportunity to create awareness about the prevention of disease and basic health care.

Having food for survival

Having a roof over their heads won't keep people alive. Having a way of keeping enough food safe and dry is essential in the wake of a disaster. The project assists local people to set up grain banks in some villages to safely store food for use during and after emergencies. Women have a major role in the food and nutrition of their family. During disasters, they bear most of the responsibility for ensuring food stockpiles.

Knowing how to staying alive

A key component of the project is first-aid training and ensuring that people know how to stay alive and how to put simple rescue

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measures in place – measures that do not put the rescuers' lives at risk. All community members are encouraged to take part in mock rescue drills so that they can practice lifesaving skills in emergencies. Skills are shared on how to make locally improvised floating devices that rise above flood waters to reach safe areas. The project recognises that it must involve women in search, evacuation, and rescue training, an area previously controlled predominantly by men.

Protecting a way of life

The project not only focuses on saving lives. It also tries to support peoples' means of living. It has developed a social network that can mobilise loans in time of need. It addresses long-term sustainability issues by encourage people to engage in environment protection activities. Putting waste in compost pits is becoming popular with households. And to ensure money for rainy days, the project has assisted communities to set up small businesses, such as bamboo and cane crafts, to help women manage better in sudden crises.

One activity that is of huge value to families, but often missed in preparedness, is captured in this project – helping families to keep their important documents safe should disasters strike.

Is the project suitable for replication in other countries?

The project's people-centred approach has received a positive response from the targeted population; they feel they now have more opportunity of escaping the devastating impacts of floods and cyclones. Local authorities in Orissa want to replicate the activity in other districts. It could also be implemented with adaptation in other countries that face similar problems.

India: Project locations highlighted in red

Mock drill – caring for the injured

Mock drill – bandaging a head injury

"Adapting to new realities"

Livelihoods and climate change in Rajasthan

Summary

This agricultural project, which began in the early 1990s, supports long-term improvements in the livelihoods of poor farming households in Udaipur and Rajsamand districts. The project demonstrates how an ongoing developmental approach to agriculture can have a positive impact on the climate. It began at a time when there was little attention for climate change. However, over time, with some of the impacts of climate change already evident and further changes likely, gradual adaptation to a changing climate has become a key element of the project. With a focus on watershed development, the project promotes the sustainable management of common lands and private arable and non-arable lands and access to water to support livelihoods. Joint forest management is a key component.

Implementing partner: Seva Mandir, India
ACT funding members: ICCO & Kerk in Actie and Church Development Service (Evangelischer Entwicklungsdienst) together with the European Union, Plan International, Ford Foundation, CIVA, among others.
Location: Udaipur and Rajsamand Districts
Coverage: 626 villages

Soil and moisture conservation efforts in Jhabla village

Rainfall down, temperature up

With a semi-arid climate, rainfall in Udaipur and Rajsamand Districts has always been low and erratic. In recent years it has become increasingly unreliable. As rainfall has decreased, average temperatures have gone up. The expected changes in climate will cause longer and more extreme periods of drought, which already occur about every four years. Farmers cannot rely on rainfall for their farming, hereby causing insufficient moisture in the soil at critical stages of the cropping cycle. The periods of drought will also negatively affect the availability of drinking water.

About 93% of households in the region are engaged in self-employed farming, most of which are producer-consumers. Landholdings are small and fragmented, with more than half of farmers owning less than 0.5 hectare. Some 70% of the land in the project's work area is under government control, and is severely degraded and contested. The removal of vegetative cover has led to increased run-off, resulting into a significantly high rate of top-soil erosion.

Forests under pressure

The forest lands of the region are mainly located on the edges and upper part of watersheds, playing the role of safeguards. Humus and organic silt flows down to agriculture fields from the well stocked lands situated higher up. This replenishes the soil each year with freshly added plant nutrients. The organic matter enhances the moisture-holding capacity of the soils, which leads to greater productivity even with rain-fed and dry-land farming. However, over the last few decades, there has been a severe degradation of these areas due to population pressure, overgrazing, cutting of trees, diversification of forest lands to other land use, and natural disasters. Encroachment of forestlands is a key concern for forests in the region. Accordingly, the role of forests as safeguards, while still vital, has reduced or even become non-existent in a few areas.

Adjusting to change

Climate change is one of the many difficulties that poor farmers in this region face in improving their livelihoods. This livelihoods project of Seva Mandir concentrates first and foremost on bringing communities together,

India: Project locations highlighted in red

increasing the space for sharing and increasing their knowledge, and seeking ways of transforming entrenched local power structures. It involves building people's capacity at local level for self-development through facilitating the formation of village institutions.

Over time, it has succeeded in using and adapting regular and proven participatory approaches to development, enabling farmers to adapt their work practices to a changing climate. Gradual and often marginal changes of existing agricultural systems and methods have been used to adapt to climate impacts.

Preserving the natural environment

In recent years, recognition of the need for a balanced ecosystem has been increasing. Especially in rural areas, livelihoods and natural resources are all interconnected and must be addressed as a whole. The poor farming population of Udaipur District is highly dependent on land and water resources and is extremely vulnerable to the effects of climate change, such as drought and flooding.

This project promotes a sustainable environment via watershed development: the conservation, regeneration, and careful use of resources such as land, water, plants, trees, and animals within a watershed. Integrating with joint forest management and the sustainable management of pasture lands and private non-arable lands, watershed development was one of Seva Mandir's main concerns long before the climate issue came on the scene. The project has significantly – albeit unintentionally – contributed to climate change mitigation in Udaipur District.

Seva Mandir has been involved with the joint forest management initiative since 1991. Since March 2009, a total of 26 joint initiatives had been approved, covering some 1,750 hectares of forest land. Village Forest Protection and Management Committees (VFPMCs) are formed in each interested village. An executive committee consisting of at least eleven members along with a women's sub-committee of at least seven members are elected from the members of a VFPMC, who are entrusted with the protection and management of village forests. The central premise is that local women and men who are dependent on forests have the greatest stake in the sustainable management of their resources.

Well cleaning work under progress on another well in Dhala

Open well in Jhabla

Taking protective action

Once the joint forest management plan is approved by the Forest Department, a loose-stone boundary wall is constructed around the designated area to restrict grazing and any other illegal activities. The physical activities involving the treatment of land and drainage lines are undertaken, with the aim of enhancing conservation of soil and water. Technical activities include construction of dams and the digging of trenches. This is followed by the planting of trees that are largely selected in consultation with local people – with most species locally grown.

Helping people and the climate

Apart from providing timber and non-timber products to local inhabitants, the common lands like forests and village pastures, being located on the upper catchments of watersheds, significantly influence the hydrogeology of the region. Well-stocked common lands in upper ridges replenish the organic matter on agriculture lands in the downstream, thus remaining the critical element in maintaining the health of the watersheds. In addition, the common lands also provide several other environmental services, notably acting as a carbon sink to store greenhouse gases, which buffers the effects of local climatic variations and climate change.

Harvesting rainwater and using less

In the project area, less than 20% of the total cropped area has access to irrigation, and farming is primarily rain-fed. Varieties of different crops and technologies that can withstand climatic variations are scarce. To address this issue, rainwater harvesting and irrigation infrastructure is planned in close collaboration with the people, supported by the technical department of Seva Mandir. The project also promotes new measures such as improved crop seeds which require less irrigation and which should withstand the variability of monsoons by maturing early, thus helping farmers to adapt to climate change. They will be better prepared and protected against the increased unreliability of rainfall.

Committee members meet to discuss forest protection and management

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Encouraging results

The project has succeeded in creating functioning village institutions in more than 600 villages, substantially increasing the capacity and capabilities of many of them. In the villages where integration of forest management and watershed management has been possible, the results are strongly encouraging.

Better natural resource management, along with adoption of appropriate and suitable farming practices, means that farming communities are now able to harvest enough, even during the years of distress. The project has led to better disaster preparedness and capability among communities to adapt to climatic change. Improved tree-cover on common as well as private lands, together with increased organic contents in the soil, sequestrate greenhouse gases as well as reduce their emissions.

Unique opportunities to explore

When this project was originally designed, climate change mitigation and adaptation was not the objective, but has been an unintended positive result. Given the predicted increase in climate related events over the next decade, Seva Mandir, along with the communities it supports, will need to expand its knowledge on predicted local climate change challenges. It will also need to explore new strategies to address the causes and impacts of climate change through building adaptation and mitigation measures more effectively into their development programmes.

"Mixing it up"

Salt-tolerant rice varieties and fruit-tree planting in coastal areas

Summary

The project aims to mitigate the effects of climate change through salt tolerant rice varieties and a system of rice intensification. The rice varieties are traditional cultivars from India. They are planted in a way that minimises the amount of seed per acre and the demand for water during the growing season. Salt tolerance is essential when coping with rising sea levels. Cropping patterns that demand less water counteract the increasing irregularity and unpredictability of rainfall.

Implementing partner: IPPHTI, Indonesia
ACT funding member: Diakonie Katastrophenhilfe, Germany
Location: Villages in Aceh, North Sumatra, and in West Java and East Java.
Coverage: 23 villages

Breaking coastlines, losing land

Parts of Indonesia were seriously affected by the tsunami of December 2004. Many communities in affected coastal areas saw their rice crops decimated. For some farmers the intrusion of salt water onto rice fields resulted in the total failure of the harvest, while the output of many went down by a half. Some farmers completely abandoned the land that has sustained them. As climate change leads to a rise in sea level, salinity problems are likely to increase. Salt-tolerant food crops and plant species are now of the utmost importance if coastal areas are to remain productive.

Varieties of hope

But Indonesia faced the problem of a lack of traditional paddy varieties, and therefore of salt tolerant traditional seeds. Many of these have been lost because of the spread of so-called high-yielding varieties and genetically modified seeds. The problem was overcome by importing suitable seeds from India, where salt-tolerant varieties are collected, stored, and replicated by Navdanya, a programme of the Research Foundation for Science, Technology and Ecology founded by scientist and environmentalist Vandana Shiva. Navdanya means "nine crops", representing India's primary source of food security.

In Indonesia, the salt-tolerant rice varieties from India were tested and further propagated. Farmers were asked to form a group, learn together and share knowledge in a Sekolah Lapang – a farmers' field school.

Learning by doing

Through these schools, where farmers usually conduct field experiments and learn by doing and through sharing of experiences, the new rice varieties from India have been distributed to more than 23 villages in Aceh, North Sumatra, and in West Java and East Java. Land has been successfully re-cultivated over six planting seasons. Out of four kilograms of seed from India, farmers in these villages had produced more than 110 tons of rice seed by early 2009. Additional protection of the coastal areas is afforded by the planting of 150 hectares of fruit trees, around two-thirds of which are local coconut trees and about a fifth mangos.

Key to success

The key to the success lies not just in the rice seed but in the planting system. The Indonesia NGO, Ikatan Petani Pengendalian Hama Terpadu Indonesia (IPPHTI), introduced a technology known as the system of rice

Stages of SRI

System of Rice Intensification

SRI is a system that was invented and applied traditionally in Madagascar from where it spread throughout Asia. There are four essential components of SRI:

- Early transplanting of seedlings from seed beds to the fields
- Wider spacing between seedlings and less seedlings per spot
- No standing water in the fields, just keeping the soil moist
- Regular weeding and organic soil management

Paddy rice husks ready to be harvested

Woman planting rice in Indonesia

intensification (SRI). This requires less seed and – crucially – less water, offering substantially higher yields, sometimes up to four times more. Rice plants grown with SRI methods perform differently to conventional rice varieties, with several times more off-shooting branches and much larger root systems which can absorb more nutrients from the soil. Needing less water compared to conventional practices, SRI means that farmers have better chances of coping with the irregularity of rainfall. SRI is therefore a highly appropriate technology in a time of climate change.

Seeds of the salt-tolerant varieties are distributed free-of-charge through the IPPHTI network to farmers who have attended a farmers' field school. After harvest, recipients must, however, hand in a certain quantity of seed for ongoing distribution. Members are also obliged to join a 'rice-barn group' which is intended to maintain food security among members in case of emergency.

Sharing varieties across borders

The selection of such varieties according to salinity, drought resistance, salt tolerance, and flood resistance, is quite recent. Possibly unique about this project is the sharing of such varieties between development agencies across country borders. Only commercial varieties are normally exported from one country to another.

Contacts and Further Reading

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How to help rice plants grow better and produce more: teach yourself and others. Prepared by Association Tefy Saina, Antananarivo, Madagascar, and Cornell International Institute for Food, Agriculture and Development, USA.
www.tefysaina.org

This project shows the importance of preserving agricultural biodiversity and of collecting traditional seed for climate change adaptation. In this context, it is essential to share on a non-commercial basis such seeds among smallholder communities around the world. The project also demonstrates how to maintain yields of important staple food crops with reduced inputs like water, seed or fertiliser under deteriorating climate conditions, according to the project manager, Kustiwa Adinata.

Could the project be replicated in other countries?

With rising sea levels, the need for salt-tolerant varieties of crops will grow, especially in low-lying areas. And with water supplies under pressure in many regions, a system such as SRI is a significant adaptive technology. The project's ideas are therefore highly relevant for other countries.

But SRI should not be regarded as a blueprint that can be implemented in the same way and in any locality. Site-specific farming technologies and practices are necessary in order to tackle the vagaries of weather and differing environmental constraints. Nonetheless, the principles of SRI can stimulate farmers everywhere in the world to look into the environmental basics of plant production and to start up their own type of agricultural adaptation experiments.

Farmer trainees from local communities

Indonesia: Project locations highlighted in red

"Creeping crisis, losing land"

Water and food production in the dry-lands

Summary

The project aims to increase food output and water supplies for people in arid and semi-arid areas. It is designed to help both agro-pastoralists – people who grow crops and raise livestock – and pastoralists. The project introduces agroforestry, pasture reserves, and innovative water-harvesting technologies.

ACT implementing member: Anglican Church of Kenya Christian Community Services (ELRECO), Eldoret Region,
ACT funding member: Diakonie Katastrophenhilfe, Germany
Location: Rift Valley, West Pokot District, Chepkobe and Ywalateke
Coverage: Three villages

A way of life changing

Climate change, and the consequent recurrent droughts and lack of water and food, have given many pastoralists little option but to drastically change their traditional, nomadic way of life and to settle in villages. It has turned them from pastoralists into semi-pastoralists.

Nomadic people have experienced a big decline in grazing land and water resources, and in livestock numbers. Added to these, cattle rustling, increased conflicts over resources, and animals that are weak and prone to disease and emaciation, have also seriously disrupted the pastoral way of life. Nomadic people have been left highly vulnerable.

This project's interaction with nomadic people revealed an awareness that their lifestyle was barely viable to sustain livelihoods. The project is helping them to make a gradual change. Men and boys might continue moving with animals, while at least some animals (dairy) stay in the villages to be milked by women and children. Agroforestry (the combination of trees or shrubs with agriculture and/or livestock rearing – see below) and water harvesting are considered to be the best options to help in this task.

A family weeding their mixed crop farm to enhance food security. It includes mango trees, a maize crop and pasture reserves (The grass is a species known as Rhodes)

Dependent on livestock

People in the project area predominantly depend on livestock for their livelihoods. Their land is highly vulnerable to climate change, especially drought. The vegetation cover is dry due to erratic and unreliable rainfall (precipitation is below 350 mm). Temperatures have increased in recent years in this part of Kenya and are regularly around 38 to 40 degrees Celsius.

When drought strikes, there is a lack of pasture for animals. To search for pasture, men migrate to neighbouring communities with all the stock. This leads to conflicts over land since every other community is moving in search of pasture. Women, children, the sick, and the elderly are left at homesteads, often with nothing to eat. In desperate conditions, all livestock have to be cleared and communities are plunged into famine.

Agroforestry – a healthy mix

The promotion of agroforestry in areas which are a bit more humid or which are close to a water source is a significant part of the project. This integrated practice in which crops and livestock, trees and shrubs, grow together in the same plot of land has proven to increase output, sometimes by significant amounts.

Agroforestry differs from traditional forestry and agriculture by its focus on the interactions among components, rather than on the individual components themselves. It not just provides crops and tree products, but helps to protect and sustain land. The practice is not new, but is now seen as highly suitable for

mitigating the effects of climate change in dry regions.

The ideas of local people and their coping mechanisms are harnessed into the project. The people decide what will work best for them. In this project area drought resistant crops and fruit trees are grown. To decide which crops to plant, the communities were approached for their knowledge. Sorghum, millet, and short-season maize were favoured. Water harvesting and retention trenches were built to help farmers irrigate these crops.

Creating barriers

The construction of sand dams is one of the water-harvesting techniques encouraged, building on farmers' local knowledge of the natural environment. Sand dams are reinforced concrete walls built across river beds, two to four metres high. Sand dams are seen as a cost-effective, innovative solution to water shortages in semi-arid areas, with the potential to transform environments.

Using water wisely

For farmers whose land is close to a water source and the dams, mango trees are planted. Farmers irrigate their mango seedlings using water from the sand dams. Once the roots are established, the mango trees survive on water from the sand dam run-off. Mangos are a good vitamin supplement for families and can also be sold in the local markets to generate income.

Conserving pasture and food

The development of pasture reserves is central to this project – taking pastoral land out of use in order to enhance natural recovery. The communities provide local labour for fencing and terracing work, and improve their land using organic manure which they have prepared themselves. Because of recurrent droughts, however, pasture seeds have disappeared and reseeding of grass becomes a necessity Another community initiative is the preservation of food by using honey, in order to have at least small portions of food ready for drought and food shortages.

Woman harvesting sub-surface water from a sand dam area

Sheep at a sand dam

A family weeding their mixed crop farm to enhance food security. It includes mango trees, a maize crop and pasture reserves.

A farm showing water retention ridges - a dry-land farming technique

Enhancing a water harvesting ridge

Adapting to new ways of working

The combination of sand dams, pastoralism, and dry-land farming techniques is relatively new for people in the area. Taken together, the project's activities will reduce the risks associated with drought and famine, lightening, for instance, the burdens on women. Instead of travelling long distances to fetch water and find food for their families, they can spend time in their farmsteads.

Kenya: Project locations highlighted in red

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"Give nature's barriers a chance"

Integrated watershed management

Summary

This project promotes the control of soil erosion, terracing, contour planting, and agroforestry all the way down from the source of the Irrawaddy river to the delta region. Mangroves – trees and shrubs that grow in saline coastal areas in the tropics – are planted to protect coastal communities from cyclones, surges, tidal waves, and sea level rises. These plantations are regarded as the creation of "nature's barrier". Experience shows that natural barriers such as mangroves are a lasting success only when the surrounding hinterland is taken into consideration in the project design. Soil erosion along the rivers flowing into the sea, for example, can easily fill up the mouth of the rivers with sediment and suffocate the mangroves.

Implementing partner: Forest Resource Environment Development and Conservation Association (FREDA), Myanmar
ACT funding member: Diakonie Katastrophenhilfe, Germany
Location: Mainly the Irrawaddy delta, but also in other regions along the Irrawaddy river

Disaster-prone

The Irrawaddy delta in Myanmar is a disaster-prone area. In May 2008, Cyclone Nargis killed or led to the loss of 140,000 people in the area, and caused huge damage to infrastructure. The area's low-lying lands are also prone to rising sea level. Large portions of the land are below the one-metre elevation line above sea level. Some coastal soils have already been washed away by tidal waves. A large area of mangroves in the delta region is under constant threat of being cut for firewood, for construction material and for aquaculture ponds.

Mangrove trees damaged due to Cyclone Nargis in 2008

Some Mangrove areas along the river bank in Delta region of Myanmar

A good stand of Thamegyi (Avicennia officinalis) after Regeneration Improvement Felling (RIF) operation - a method of inducing natural regeneration and better growth

Once the mangroves are gone, people living in nearby settlements become more and more vulnerable to natural disasters. Since this part of Myanmar is considered to be the rice bowl of the country, often food security in other districts and provinces is at stake when disasters hit the delta region.

Trees with a reputation

Mangroves have a proven reputation for protecting coastal areas from extreme weather. Even in areas hit by the tsunami in 2004 and by Cyclone Nargis in 2008, the damage caused was significantly less where mangroves were still intact.

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Mangrove seedlings in the process of transportation by boat

Tea trees are planted along the contour to reduce soil erosion in degraded forest areas of Peinnepin, Kalaw township, Shan State

Myanmar: Project location along Irawaddy River running through middle of country

Mangrove trees and shrubs (of which there are about 60 different types that grow in saline coastal habitats in the tropics and sub-tropics) are said to be the "kindergarten" of maritime fauna. Many species of fish, shrimps, crabs and shells grow or replicate in this habitat which is consisting of a blend of brackish and sweet water. Due to this and because mangroves also provide traditional medicine, flowers for beekeeping, and excellent wood for construction of houses, boats, or furniture, poor fishermen in developing countries are very supportive of projects trying to protect and restore such forests. So this project is another example of combining disaster risk reduction with short-term livelihood improvement of poor communities in developing countries.

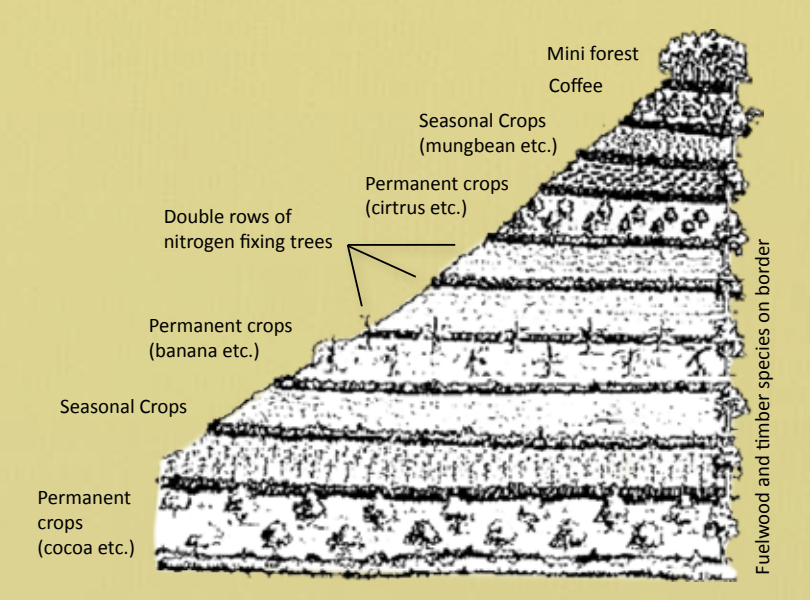
Destruction at a price

Many mangrove forests around the globe have been destroyed in recent years to make way for paddy cultivation, shrimp farms, tourist complexes, and other uses. To a large extent, such commercial enterprises do not reflect the interest and objectives of poor local communities nor do they properly share the benefits with them.

Enabling natural re-growth and not replanting
Just replanting mangroves is not advised by many experts. It is often better to provide for the environmental conditions that favour natural re-growth. The local hydrological situation is as important for the survival of mangrove forests as the land use patterns upstream. A project that pursues a wider perspective than just planting trees and that takes into account various ecological, social and economic factors, can be regarded as disaster risk reduction through environmental management.

Planting for prevention

The project encourages people to practice agro-forestry on the slopes of hilly regions to help soil conservation and reduce siltation in nearby rivers. It is based on the Sloping Agriculture Land Technology (SALT) approach, shown in the graph below.



Contour planting – planting trees and crops horizontally across the declination of the slope – is seen as the key to success against disasters that are caused by soil erosion, siltation, and floods. It also slows the flow of water. Often contour planting goes along with agro-forestry which is a combination of farming/agriculture and forestry, for example by planting trees on farmland or pastures.

Nurturing new ways of working

The project is implemented by local people, according to their knowledge, interests, and objectives. Local people are given user-rights to the new forests planted. This ensures their ongoing participation and is a prerequisite of any successful reforestation project, be it with mangrove trees or any other upland species. Without user rights in the hands of local communities, protection and maintenance of such forest projects remain costly, inefficient, and socially inappropriate.

This project has promoted the formation of "Community Forest-User Groups" in order to monitor the growth of trees, to protect them from destruction for commercial reasons and to make sure that if they are cut, they are harvested in a sustainable way and for the benefit of the local communities.

Mitigating climate change

The newly planted, as well as the protected mature forests will help in combating global warming as the forests serve as carbon sinks, capturing and storing carbon dioxide (C02). When reforestation is undertaken in degraded lands (for example, former shrimp ponds that had to be abandoned because of disease infestation and paddy fields deserted by farmers due to salt seepage from below), there is a significant increase in the amount of CO2 stored (net sequestration).

"Holding back the river"

Flood mitigation through bio-engineering and conservation

Summary

The project seeks to reduce the devastating effects of recurrent flash floods in the Biring River in the east of the country, by planting local trees and grasses and other land protection technologies, and by encouraging the natural regeneration of vegetation. The planting of mature stems of bamboo is increasing, and also the use of bamboo mesh.

ACT funding and implementing member: Lutheran World Federation Nepal
Location: Eastern Development Region, Jhapa District, Arjundhara & Khudunabari Village Development Committees.
Coverage: 2,912 people in 550 families.

A tall, local grass called "kans" (Saccharum spontaneum)

Spurs (use of stones and gibbon wire and plantation) seen near a river in eastern Nepal as a measure against floods. ©LWF Nepal

Protecting land and livelihoods

The project works in partnership with the people affected by river erosion. It sensitises communities about how they can protect their land and livelihoods from devastating flooding. Disaster management committees have been formed in the areas where communities are most at risk from water-induced disasters.

River erosion has caused huge difficulties for the people who live close to the Biring River. The floods have occurred with such intensity that they have damaged houses and swept away hundreds of hectares of cultivable land. Vast swathes of good farmland have been turned into virtual desert.

Under the project, massive numbers of mature stems of bamboo have been planted along the banks of the river, sometimes stretching 100 metres from the bank. These mature stems grow quickly to give the necessary protection against flooding.

Grass-rooting the soil

A tall, local grass called kans has been planted. This is a little like African elephant grass, except that its stem and leaves are thinner and sturdier, and it has very strong and bushy roots. It holds the ground tightly to protect from erosion. Only local species of trees and grasses are used. Farmers have given up their land for this planting.

Technical training has been provided on matters such as conservation, plantation, and river protection measures as well as support for buying trees. Community members contribute their time and labour to plant the tree and grasses. Community members then ensure that the planted lands are grazing- and cultivation-free zones. A fine is levied by communities on members or outsiders whose cattle enter into protected areas.

Bamboo as stabiliser

A further important technology is the construction of bamboo mesh in the breaching points of the river. The bamboo mesh is filled in

with sand bags; bamboo and grass are planted just behind the mesh. This can prevent river bank erosion and flooding for around three years. By this time the bamboo will have grown into a natural embankment.

The process of desertification due to river erosion has now been controlled significantly. Natural vegetation has begun to return and cover the "wasteland". The river width is getting narrower, and the destructive effects of flash floods have been reduced.

The micro-climatic of the area has also improved. Formerly, at the end of each summer most of the water sources close to the river-basin dried up. Until two years ago the river was almost empty because of low volume of water in the river. This was compounded by underground water spreading over a wide area and by the evaporation of water due to the openness of the river basin. This has now improved.

And it generates money

The bamboo and grasses have grown well and the vegetation is now a good source of fodder for livestock. Stubbles of vegetation are widely used by the community as compost to enhance soil fertility. People have begun selling grass and bamboo to neighbouring communities, generating additional income.

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Could the project be replicated in other countries?

Measures that were successful in Arjundhara village have been replicated in around 42 Village Development Committees of Jhapa and Morang districts in the eastern region of Nepal. They are developing nurseries, growing thousands of saplings, and planting them every year over thousands of hectares along the river banks.

The project uses an environmentally-friendly and cost-effective technology, which could be replicated in other countries. Given the extensive use of local resources and low costs involved, it is affordable for local communities.

River embankment, using bioengineering in eastern Nepal, working area of LWF Nepal. ©LWF Nepal

Nepal: Project locations highlighted in red

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"Making sparks fly"

Tree planting, electricity production and biomass

Summary

The project's aim is to reduce vulnerability to natural disasters by encouraging rural people to plant trees that stabilise food production, protecting against the vagaries of unpredictable rain. The trees provide the raw material for gasifiers –- wood gas generators -- that generate electricity for their homes and farms. Electricity supply based on renewable energy is thus an incentive for poor farmers to embark on disaster risk reduction.

Implementing partners: Aspira Gte Ltd (a non-profit company) and manufacturing partner Lanka Gasifiers Pvt Ltd (LGL), Sri Lanka
ACT funding member: Diakonie Katastrophenhilfe (DKH), Germany
Location: Southeast Sri Lanka
Coverage: Seven rural communities; with a reach of more than 500 people

Trees to resist the elements

Frequent floods and droughts are affecting agriculture and food security of the poor in southeast Sri Lanka. Extreme weather makes the integration of trees into agriculture (agroforestry) an essential element of stabilising farming and crop production.

Due to the modernisation of agriculture and the philosophy behind it – things that do not pay off immediately in monetary terms are regarded as useless or unnecessary - many trees have been removed from farmers' fields. But without trees, farming in tropical climates becomes highly susceptible to droughts, floods, cyclones, soil erosion and disease.

A gliricidia sepium tree plantation

Notwithstanding the century-old wisdom of farming communities, attempts to convince farmers to grow trees have met with little success. Smallholders are often reluctant to invest time and resources in tree planting as the beneficial effects are not immediate. Often people have more pressing matters – such as meeting their daily food requirements. Electricity gives a more immediate incentive for farmers to plant more trees and thus stabilise their food security in the long run.

Multi-purpose tree species

In this project, the species of tree planted – gliricidia sepium – are medium size leguminous trees that can grow from 10 to 12 metres high, belonging to the family Fabaceae. They are viewed as hugely important multi-purpose trees because they are fast growing, fix nitrogen from the air, and enrich and condition the soil, increasing its water-holding capacity. The foliage provides nitrogen-rich manure, reducing the need for artificial fertiliser. The low shade provides an environment for other positive organisms to regain a foothold that can, for example, control predators that are harmful for food crops.

Shade also reduces evaporation and therefore allows smaller, short-season crops to better survive droughts. Water run-off from the slopes is reduced by the roots forcing the water to

Sri Lanka: Project location in Southeast

percolate into the soil and add to the ground water table.

Electricity out of trees – not a miracle

The project has developed and distributed gasifier units to seven remote villages in Sri Lanka combined with reliable electricity supply. When trees are pruned, the twigs and branches are fed into a community-level 12 kWe gasifier generator, called 'Lanka SunRay 100'. While the gas engine comes from India, most of the parts in the gasifier can be built by local mechanics.

In an average community, in the project area, around 50-70 households deliver the raw material (wood chips) to the gasifier and receive electricity. Every household has to deliver 60-70 kg of dried wood chips monthly. In return, they receive 100 watts of electricity per household for around four hours a day. This is enough for 3-4 bulbs and/or a radio or even a television. After initial development and testing, the technology is working well. The project has led to the planting of around 30,000 trees in each of the seven communities covered.

Linking renewable energy to risk reduction

The project serves as an example for combining renewable energy to disaster risk reduction. It reduces the susceptibility of farming and food security to deteriorating weather conditions in the long run and helps to immediately improve living conditions of communities whose full potential has not been exploited. This project suggests that in the context of poverty one cannot successfully tackle future hazards and risks without addressing the actual needs of the people.

A community-run enterprise

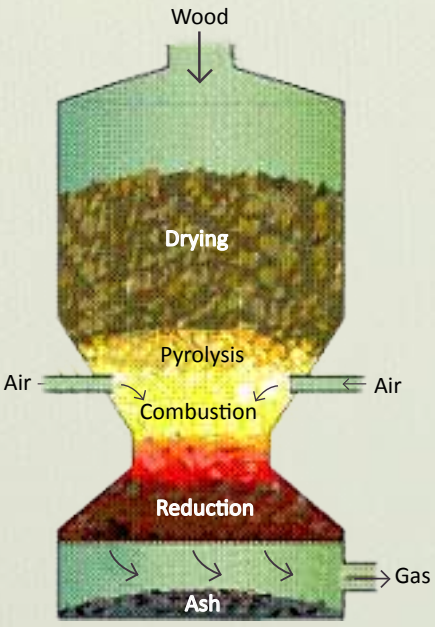
In addition to DKH-funding, this project also receives funding though commercial bank loans at a concessionary rate agreed under the World Bank's Renewable Energy for Rural Development Project. Some expenses like the labour costs for planting the trees, for the wire, for setting up the village grid and for the gasifier have to be met by the villagers themselves. This amounts to roughly half of the entire project

Wood chips being laid out for drying

Adding woodchips to gasifier to produce energy

Stages of Gasification

Gasification is a method of extracting energy from organic materials known as biomass (e.g. dead trees, branches, tree stumps, and wood chips). In order to deliver sufficient quantities of chips, local people participating in the project need to grow trees whose twigs and branches can be pruned, chopped into smaller pieces, and sun-dried. The right tree species must be chosen to ensure that pruning does not damage the tree, but instead makes it speed up further production of twigs and branches.



Wood Gas or Producer Gas

Girl doing homework before connection to electricity

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Family enjoying electricity

costs. However, under current conditions households usually spend US$3-4 per month for just kerosene. Once the loan is repaid a community can save the money it would normally spend on kerosene. The village society is responsible for collecting money from households and for organizing the delivery of wood chips.

Carbon neutral

An average family in the project area burns 10 litres of kerosene per month for lighting which is equivalent to approximately 25 kg of CO_2. This source of greenhouse gas emissions is now gone. Each tree planted provides more than 6 kg of dry biomass per year which is in excess of the requirements for electricity generation. By using sustainably grown fuel-wood, the system is carbon neutral. Neither does the gasification process lead to any significant emission of toxic gases.

Some other benefits

The project has given people, especially the young, an incentive to stay in their villages and not move away into the cities. For families, incomes are likely to increase as the improvement to soil fertility reduces fertiliser costs. Electricity in their homes enables families to undertake small-scale income generating activity in the evening if they wish. Children can do their school home work and studies. Health conditions inside homes have improved as the inhaling of kerosene fumes is eliminated.

Is the project suitable for replication in other countries?

Yes, especially for countries where only a small proportion of the population is covered by the electricity grid. But 'the economy of scale' also matters: while the technology is sound, a 12 kWe gasifier is small and relatively expensive. For larger villages, larger gasifiers would be more economic.

"Crossing the policy-practice divide"

Linking community-led research with community-based adaptation

Summary

This project attempts to systematically understand the impact of climate change on the people of Tajikistan, how communities cope with it, as well as supporting practical ways of adapting to it. It has a two-pronged approach focusing on community-led research on the impact of climate change, and community-based adaptation. The project is particularly concerned with protecting the interests of the poor.

Implementing partner: Youth Ecological Centre, (YEC) Tajikistan
ACT funding member: ACT Central Asia consortium, consisting of Christian Aid/ ACT Central Asia, DanChurchAid (DCA), and ICCO & Kerk in Actie (Interchurch Organisation for Development Cooperation)
Location: Adaptation work across five villages and research throughout the country.
Coverage: 3,056 people have benefited directly from the adaptation work

Risks more apparent

Tajikistan is a Central Asian country often severely affected by a number of hydrological, geophysical, and drought-related disaster and livelihood risks. These manifest themselves in the form of earthquakes, floods, and mudflows; accelerating retreat of glaciers; and loss of water resources. Temperatures have increased during summer, as have droughts and erratic weather patterns. Declining water resources have impacted on agricultural activity resulting in loss of employment, migration, and poverty.

While rapid onset disasters such as earthquakes tend to dominate national and international attention, over the past five years risks and vulnerability associated with climate change have become increasingly important at community level. Drought-related disasters, in particular, and temperature extremes, are increasing in severity and frequency as a result of climate change. The negative – and increasing – impacts on peoples' lives are exacerbated by the rough physical terrain, decaying rural infrastructure, limited community understanding of their legal rights, and limited government capacity and support services. More and more, communities are finding it difficult to predict climate changes or obtain access to information on likely future climate change.

Local perceptions of change

One of the key components of this project (known locally as the Climate

Trainers from agriculture science academy in Biskent interact with the farmers. One of the farmers shows the yield to the staff of Christian Aid and YEC.

Christian Aid/ACT Central Asia staff visit greenhouses and interact with women farmers in one of the target villages

Change and Country Vision project) is community-led research with the aim of studying the impact of climate change on the well-being of communities, as perceived by the people themselves. To kick-start the process, for three months the local Youth Ecological Centre (YEC), with the support of Christian Aid, conducted research among communities in rural, agricultural districts on public perceptions of climate change. It was supported by the local NGO "For Earth".

A simple research methodology

The research methodology (which included households surveys, individual interviews, review of secondary data, and focus discussion groups) was designed to ensure that targeted groups found it easy to participate and contribute. Throughout the process, data was collected on climate change observations in the previous five years and its impacts on living standards, health, the ecosystem, agriculture and socioeconomic dimensions.

Tajikistan: Project location

Recognising gender and diversity

A variety of information gathering techniques was necessary to capture perspectives from people of all educational backgrounds, gender and diversity. During the discussions, project staff shared information on climate change, informing communities where they could find further information and where they can access weather predictions for their areas.

The findings

Significant data was collected on particular observations of climate change for the previous five years and its impact on living standards, health, the ecosystem, agriculture, profit levels and employment. The research revealed that communities were becoming increasingly vulnerable to the impacts of climate change. The negative impact of temperature extremes had led to a reduction or loss of income due to reduced crop yields. In the district of Soghd, farmers pointed to the difficulty in finding pastures for livestock due to the reduced water table and decreasing water in the local river, particularly since 2005. Women farmers noted that their harvests had fallen consistently over four years mainly due to the unusually hot weather. One farmer saw a fall in crop productivity of 30% in 2006 because of climatic changes particularly with the sweet melon crop due to the extreme heat and reduced rainfall. A local teacher claimed that the melon crop was "close to being lost completely".

The benefits of knowing more

The data and community feedback assisted in developing domestic strategies for climate change adaptation. Based on an analysis of the research findings, local and international partners in the ACT Central Asia consortium worked together to develop advocacy strategies and began to actively take part in climate change-related political dialogue at the regional, national and sub-national level. This enabled the integration of locally identified risk

reduction and adaptation measures into sub-national and community development plans.

The research was a powerful tool for creating awareness and increasing interest among local communities on climate changes and what they could do as individuals and communities to adapt to the changes. It also led to the establishment of positive links between local NGOs and the national authorities. One example is improved coordination between the Tajik Hydromet (the State Administration for Hydrometeorology) and NGOs – the outcome of which led to the authorities agreeing to include an NGO representative on their official delegation to the international climate change negotiations. NGOs are now continuing to implement this advocacy process aimed at influencing national level decision-making.

Linking policy to practice

One key outcome of the research at the operational level was the strengthening of the adaptive capacities of the local communities. It also provided concrete recommendations on the potential of appropriate technologies. As a result, the project piloted a number of community-based projects in five villages to enable residents to adapt to the changing situation – particularly to severe drought conditions. To initiate the process, each community conducted a risk and vulnerability assessment, a step that is seen as crucial to the success of any adaptation project. Based on the results, community action plans were developed aimed at reducing exposure to hazards and risks. Such plans, built on local knowledge and traditions, included the rational use of natural resources and preservation of agricultural and biological diversification.

Local farmer and family use greenhouse for indoor planting

Project staff and technical experts increased local peoples' understanding of the benefits of drought-resistant seeds, water conservation technologies, viable greenhouses, and renewable energy sources. Scientists were involved in the selection of the best, low-cost options for alternative energy sources for the communities.

Using appropriate technology

A number of local ways of working were adapted to improve food security. One technology introduced to adapt to drought situations was drip irrigation – a technique widely promoted for improving vegetable cultivation in arid areas. Along with more conventional tubular piping methods, local people also improvised by using recycled materials. For the irrigation of fruit trees, 1.5 litre water bottles – recycled bottles – are submerged in the soil to ensure water reaches the root system, or were suspended above the seedlings. This minimises water evaporation and ensures efficient use of water. In addition, more than 50 poor families have benefited directly from nine newly erected greenhouses. The greenhouses help to protect vegetable harvests and to receive early seeds when temperatures drop. Another 100 families benefited from local seed funds.

Using local expertise

Project staff train farmers in drought-resistant cultivation methods. Local farmers, mainly women, grow vegetables, especially special varieties of tomatoes, which are drought-resistant and therefore require less water for irrigation. The farmers are trained in the cultivation of local varieties of drought-resistant corn (maize) and beans, and in the changes they need to make to their usual routines to make them more resilient to climate change.

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Further details of the methodology can be found in the project report **"Public Perceptions of Climate Change in Tajikistan and Kyrgyzstan"** by the Youth Ecological Centre of Tajikistan et al., at: www.ecocentre.tj/public/userfiles/pdf/ReportCCENG.pdf

Lerma's story

A final note of inspiration from the Philippines

This is one girl's story of what she is doing to adapt to climate change.

My name is Lerma Villaruel. I am 10 years old and I will be entering Grade 4 this coming school year. I have four brothers and sisters, which makes us seven in the family. My father is a fisherman and my mother works at home. We live in a small bamboo hut very close to the sea on an island called Tabon.

I first heard about global warming and climate change in school. And I know that climate change is now happening in our island. First, there was El Nino and now, La Nina. After El Nino, the soil was dry and difficult for growing vegetables and rice. Water pumps and wells have dried up, and there aren't a lot of fish for fishermen like my father to catch.

Parents have to cross the island in order to buy water. Nowadays, we have more rainy days and typhoons even in the summertime. Many places in our village get flooded easily with even just a little bit of rainfall. The water from the sea and flood waters is flowing into places that were dry before. I think that the land inside our island is getting smaller, eaten up by water from the sea and actually shrinking.

We don't wish for things to get any worse. So, that is why the children of Tabon are doing many things together with our parents to help stop climate change.

Philippines: Project location highlighted in red

These are:

- Separating waste. We separate different types of waste and also make compost. Many homes are not burning their trash anymore. Instead, we make our own small landfills.
- Fruit tree-planting. Each pupil in our school including me planted fruit trees on the hill near our school. Others planted vegetables.
- Mangrove planting. When we see a mangrove seed spread, we automatically plant it along the river bank. Mangroves are important because these provide houses, breeding areas and sources of food for fishes and shells, and also serve as protection against floods and strong winds.
- Community Clean-Up Drives. We, children, go with our parents and other neighbours to clean our coasts and inside our village. These have become regular village activities where our fathers and mothers, government people, and children like us help remove the trash.
- Coastal cleaning. This is a one-day school coastal clean-up activity by pupils and teachers.
- Play and clean. During weekend or summer vacation, we, kids, like to swim. While swimming, we also avoid throwing garbage into the swimming area and even pick up any trash along the way.

I think we are making a difference and I believe that there is still hope for all of us.

Details about the project in which Lerma has been involved can be obtained from:
Volunteers for Development in Philippine Society (DEVELOPERS) Foundation, Inc./Christian World Service, New Zealand. Contact: **Teresa G. Naraval**; *email: developersfoundation@yahoo.com*

Who We Are

Action by Churches Together (ACT) International is a global alliance of more than 130 churches and related agencies working to save lives and support communities in emergencies worldwide. Established in 1995, ACT members are Protestant and Orthodox churches and their related agencies, drawn from the membership of the World Council of Churches and Lutheran World Federation.

ACT members' strong local roots enable the alliance to provide locally based knowledge, analysis, and understanding of emergencies and disasters. ACT recognises that, as important as identifying vulnerabilities and providing for people's immediate needs are when crises occur, a vital component of its response is recognising the valuable gifts communities in crisis contribute: coping mechanisms and strategies for survival, skills and strengths; wisdom and knowledge; and resilience and courage. Strengthening local capacity lies at the heart of our responses to emergencies.

The ACT alliance coordinates its global responses to humanitarian crises through the ACT Coordinating Office, which is based in the Ecumenical Centre, Geneva, Switzerland, where it is registered as a legal entity. In January 2010, it will unify with the ACT Development alliance to form one global ACT Alliance of approximately 165 members.

ACT seeks to promote justice and rights for women, men, girls and boys affected by climate change.

ACT International
Action by Churches Together

Tackling Climate Change:
Communities Making a Difference
Good Practice in Action

Church of Sweden

FOLKEKIRKENS NØDHJÆLP
VI TROR PÅ LIV FØR DØDEN

Diakonie Katastrophenhilfe

FINN CHURCH AID

ICCO
Partner to enterprising people

KERK IN ACTIE GIRO 456

Lutheran World Relief

NORWEGIAN CHURCH AID

"Adaptation to mute the impact of climate change will be essential in the poorer parts of the world… Development itself is key to adaptation. Much adaptation should be an extension of good development practice and reduce vulnerability by:

- Promoting growth and diversification of economic activity;
- Investing in health and education;
- Enhancing resilience to disasters and improving disaster management;
- Promoting risk-pooling, including social safety nets for the poorest.

Putting the right policy frameworks in place will encourage and facilitate effective adaptation by households, communities and firms. Poverty and development constraints will present obstacles to adaptation but focused development policies can reduce these obstacles."

Extract from the "Stern Review Report on the Economics of Climate Change", pg. 430, by Sir Nicholas Stern, 2006

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